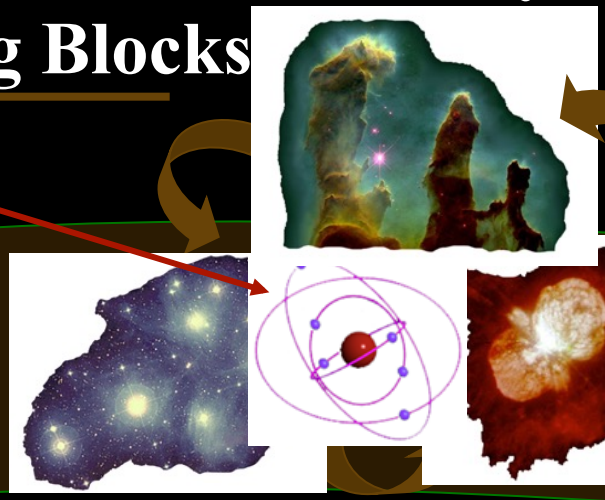
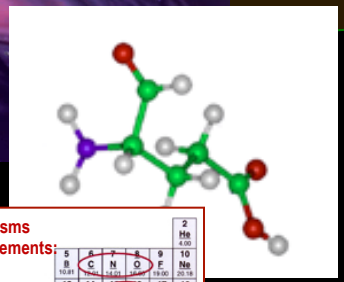
# The 13.8-Billion-Year Cosmic Factory Made Life's Building Blocks

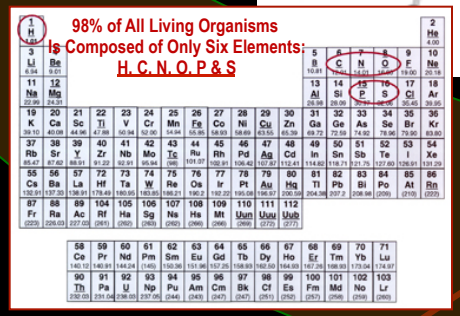
The Big Bang

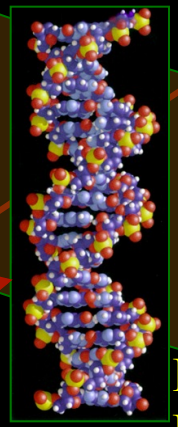
Other Atoms Were Made through the Birth and Death of the Stars

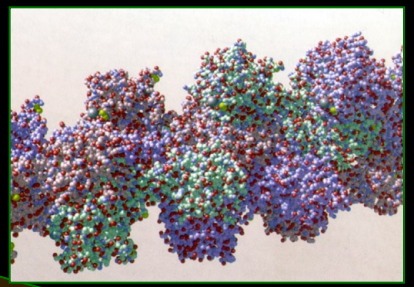




At the Beginning, There Was Only the Hydrogen Atom



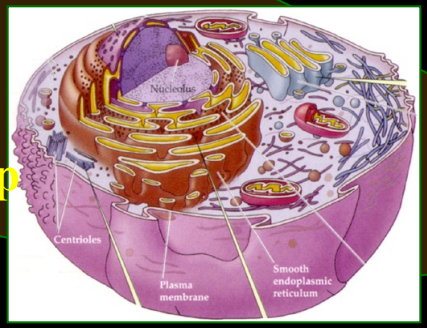





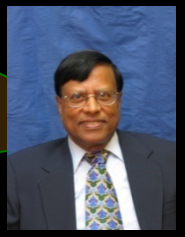
There Are 100 Trillion Cells in a Human Body

Proteins and DNA Macromolecules Are Made Up of Millions of Atoms

Proteins Make Up Much of the Human Cell




A good solution



# Some facts about Raj!

**He has published about ten papers and graduated about one PhD student every year since he was born!**

## EDUCATION

**University of Calcutta , India - M.S. in Radiophysics and Electronics, 1953**
**University of Toronto , Canada - Ph.D., Electrical Engineering, 1957**

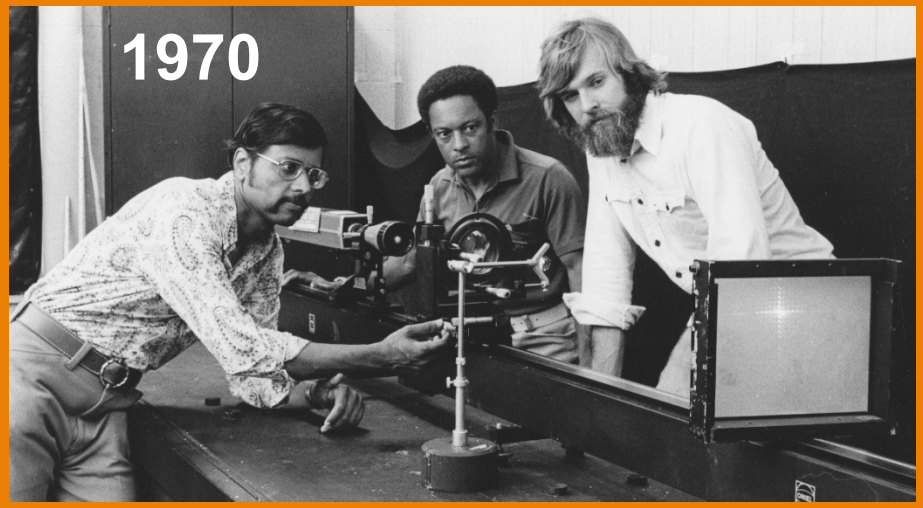
## SELECTED AWARDS AND ACHIEVEMENTS

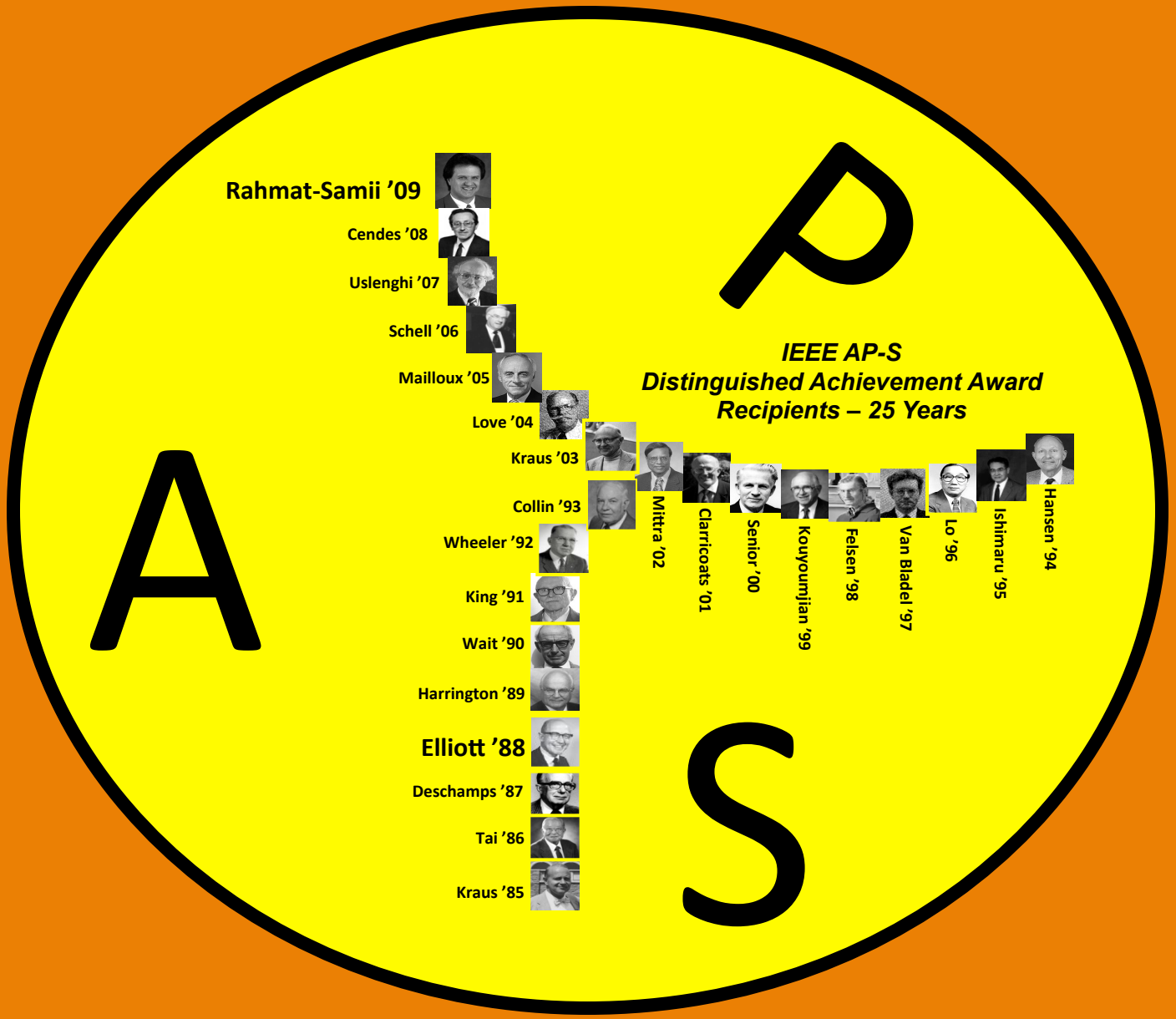
**Guggenheim Fellowship Award (1965),**
**IEEE Centennial Medal (1984),**
**IEEE Millennium medal (2000),**
**AP Distinguished Achievement award (2002).**
**IEEE Electromagnetic Award (2006)**
**IEEE James H. Mulligan, Jr. Education Medal (2010)**

## MENTORSHIP

**About 80 Ph.D. theses, 85 M.S. theses, and has mentored more than 50 postdocs and Visiting scholars. Over 900 papers.**

# Some photos!






# IEEE AP-S Distinguished Achievement Award – 25 Years

# Raj has always been in demand as an entertaining speaker

**EVENING SEMINAR** *sponsored jointly by*

Department of Electrical Engineering
Washington University
and
St. Louis Joint IEEE Chapter on Microwave Theory and Techniques/Electron Devices/Antennas and Propagation

## NOW YOU, TOO, CAN LEARN TO USE THE GTD FOR FUN AND PROFIT

*PROFESSOR R. MITTRA*
*Distinguished Lecturer - Antennas and Propagation*
*Associate Director, Electromagnetics Laboratory*
*University of Illinois, Urbana*

A newcomer in the GTD (Geometric Theory of Diffraction) game often finds that there is an aura of mystery in the way the experts use the ray theory. The experts know, for instance, what uniform theory to use at the shadow boundaries so that the fields behave themselves, and also know precisely what line currents will make the infinities in the caustic directions disappear like a headache after Excedrin.

The purpose of this talk is to put the ray optical methods in a new light with the hope that anyone with a little background in diffraction theory can generate his own solution to the high-frequency diffraction problems without ever being haunted by the fear that any of these fictitious infinities will descend on him mysteriously from nowhere. In addition, methods will be discussed to test the class of problems where ray theory is accurate and also where it is not, and how to make systematic improvements in the ray optical results when such improvements are warranted.

**Tuesday, 17 May 1977**
**8:00 P.M.**
**CUPPLES II, ROOM 100**
**WASHINGTON UNIVERSITY**

Ron, see if you can come too.

# What is it all about!

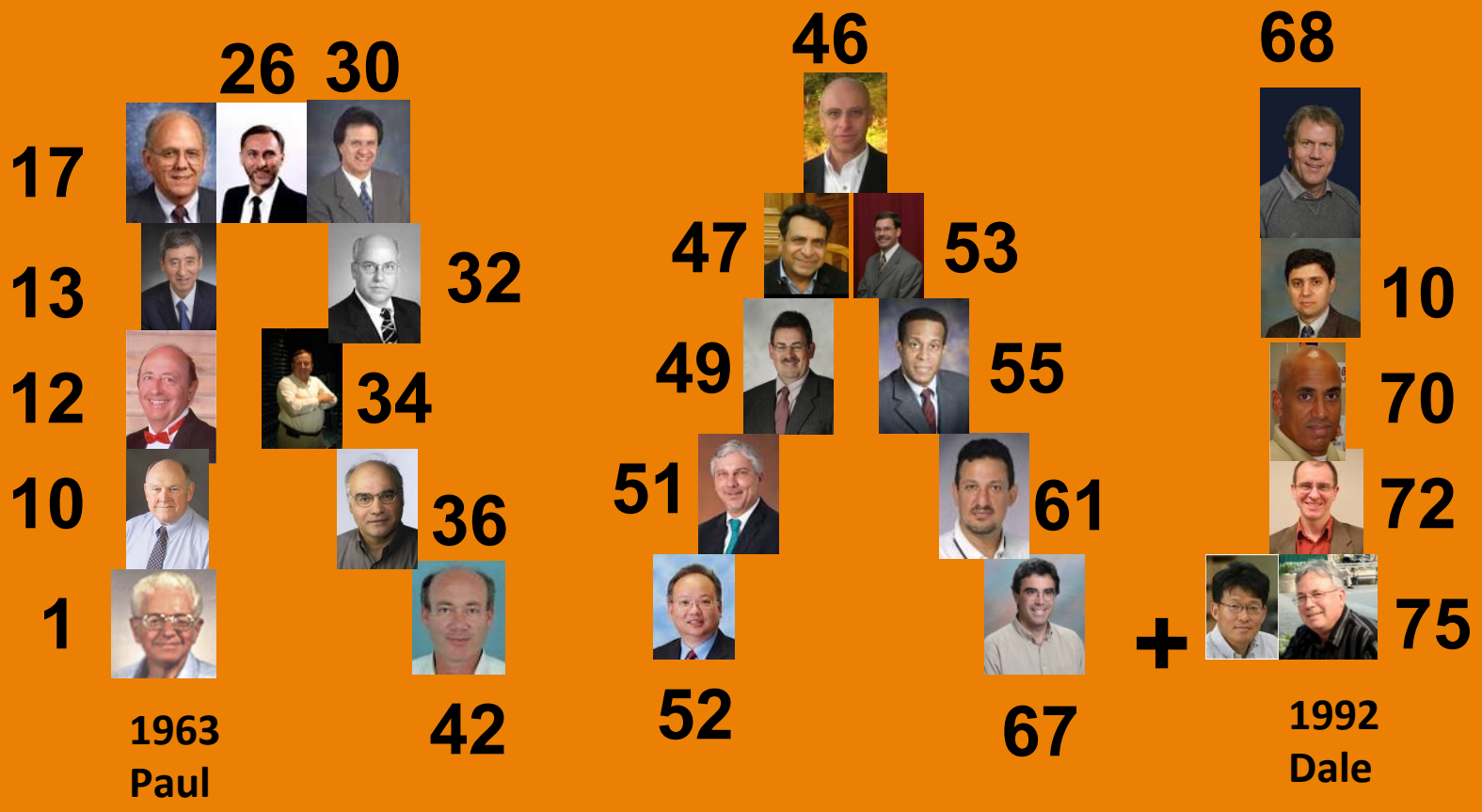
*It has been once said, "When you look back at your life it is not all the papers and books that you have written, it is not how many awards that you have received and it is not how many proposals that did not get funded, it is rather your family, friends, colleagues and most importantly your students that you have mentored, collaborated with and in the process you have touched their lives and they have touched your life."*

**Raj – We thank you for your mentorship and friendship.**

# Raj's most important legacy is his over 75 PhD and 65 MS students and numerous Postdocs at the University of Illinois

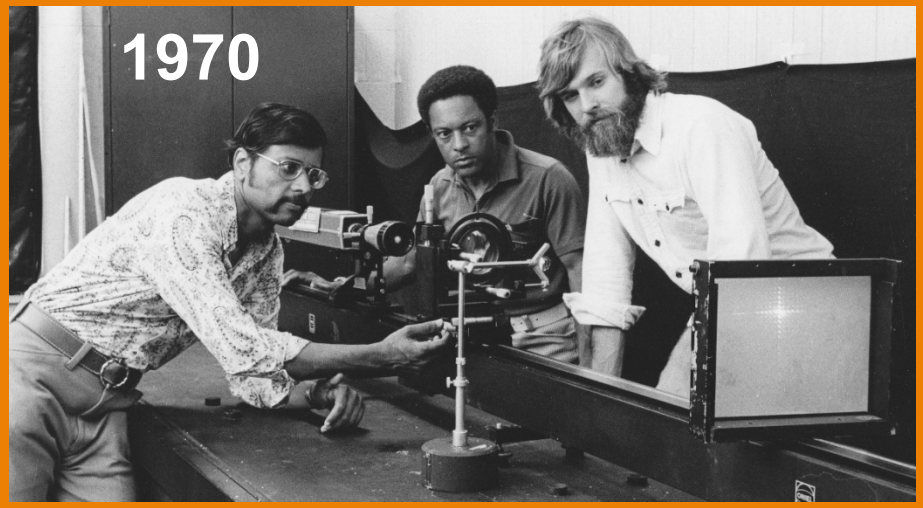
**There are nearly 75 PhD students. We were able to find photos of 25 and most of them are here tonight!**

# Raj's most important legacy is his over 75 PhD and 65 MS students and numerous Postdocs at the University of Illinois



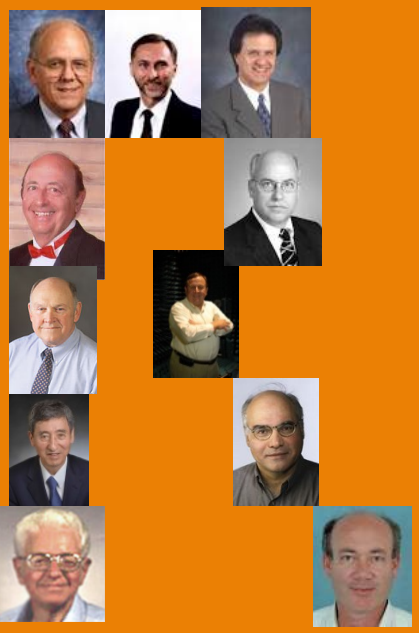

There are nearly 75+ PhD students. We were able to find photos of 26 and most of them are here tonight!

# Some photos!

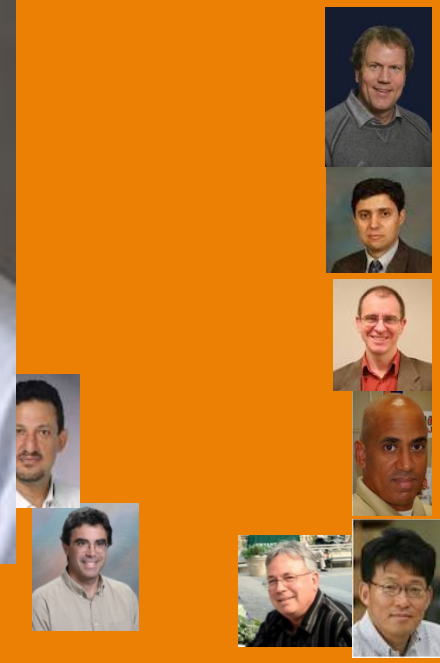


# Raj's PhD Students
# 60's (15 of them)

No. 10



1963
Paul



1992
Dale

**There are nearly 75 PhD students. We were able to find photos of 25 and most of them are here tonight!**

# Raj's PhD Students
# 70's (22 of them)

No. 32

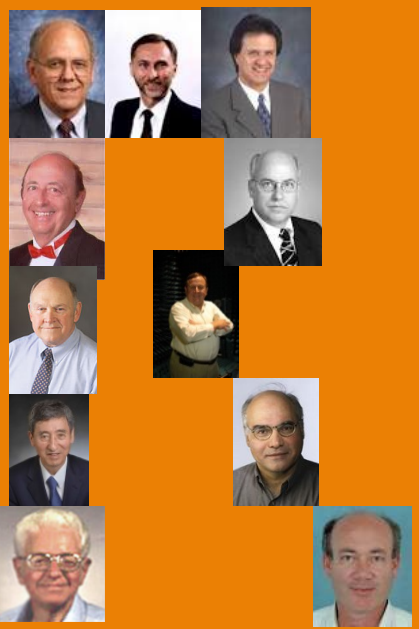
1963
Paul

1992
Dale

**There are nearly 75 PhD students. We were able to find photos of 25 and most of them are here tonight!**

# Raj's PhD Students
# 80's (24 of them)

No. 51



1963
Paul

1992
Dale

**There are nearly 75 PhD students. We were able to find photos of 25 and most of them are here tonight!**

# Raj's PhD Students
# 90's (14+)

No. 72

1963
Paul

1992
Dale

**There are nearly 75 PhD students. We were able to find photos of 25 and most of them are here tonight!**

*Raj: We salute you for your outstanding achievements in educating so many successful students. We wish you and your lovely wife a healthy, prosperous and happy retirement.*

# Raj's PhD Students

**Six of them became elected IEEE AP-S and MTT Presidents**

**Two of them became member of National Academy of Engineering (NAE)**

**Many of them became IEEE Fellows**

**Many of them became professors and department heads**

**Many of them became leaders in industry**

# Three of Raj's PhD students receiving top ACE's Award in 2013

# Antenna Engineers and Researchers Can also Have Fun!

Boston' 2001